# NASA Procedural Requirements

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**COMPLIANCE IS MANDATORY**

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## Subject: NASA Program and Project Management Processes and Requirements

**Responsible Office: Office of the Chief Engineer**

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# CHAPTER 7. Institutional Projects

## 7.1 Four-Part Project Management Process

7.1.a To conduct its missions, NASA must also implement projects aimed at building institutional infrastructure. These investments are typically managed by Mission Support Offices with close linkage to and often direct funding from mission programs and projects. Several types of investments fall into the category of institutional projects: the development of real property, (construction of facilities (CoF) and environmental compliance and restoration (ECR)) projects, information technology (IT) projects, and other functional initiative (OFI) projects. This chapter provides requirements unique to the management of these institutional investments.

7.1.b NASA's real property investments represent institutional projects designed to acquire, maintain, remediate, and dispose of the facilities, plant, equipment, and systems needed to support programs and projects. NASA's goal is to ensure that when construction is needed, facilities are planned, designed, and constructed for sustainability. Project Managers must ensure that the facilities are of the right size and type; are safe, secure, and environmentally sound; provide quality workplaces; operate efficiently and effectively; and are retired when economically appropriate.[41] Sometimes real property investments are funded directly from mission program or project budgets; at other times they can be funded from indirect funds, indicating general purpose use.

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[41] Proper asset valuation is key to being able to make strategic decisions about the recovery and maintenance of institutional elements so as to provide programs and projects with the most cost-effective solutions possible. Real property funded directly for use by a program or project has a retained value at the end of its initial use, a value that can exceed its original cost. Many NASA facilities find new uses that are impossible to foresee at the outset of their initial development.

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7.1.c IT investments are a large part of NASA's annual spending and are critical to mission success as well as efficient day-to-day operations. These investments demand a great deal of interaction between Headquarters and the Centers to meet the complete set of Agency goals. As with real property investments, IT investments are sometimes funded directly from mission program or project budgets; at other times they can be funded from indirect funds, again indicating general purpose use.

7.1.d OFI investments capture a myriad of large and small projects that support NASA missions and Agency operations. The Integrated Financial Management System (IFMS) and educational projects are examples of OFI investments. OFI projects are always managed by Mission Support Offices, typically through cross-cutting Agency programs.

7.1.e Management approval of institutional projects is generally provided by a governing authority (e.g. Board, Council, Institutional Committee (IC)), including many of those funded directly from mission sources.[42] Institutional projects are subject to the same categorization scheme as required of other projects. In most cases, institutional projects represent small-to-moderate Agency investments and are lower risk developments, placing them in

Categories II and III. Some institutional projects can be Category I but regardless of size, the governing authority approves and reviews all categories of projects in accordance with their charter and processes.[43] Figures 7-1 and 7-2 show the nominal project lifecycle for institutional projects.

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[42] In the case of institutional investments, references to the GPMC structure in Chapters 1, 2, and 3 should generally be replaced by references to the IC, and references to the MDAA by MSOD.
[43] The Chair of the Agency PMC can, on occasion and by exception, require a Category I institutional project to report to the Agency PMC. This can occur when an institutional investment is especially critical to the mission success of a NASA program or project, or is viewed as vital to the overall performance of the Agency.

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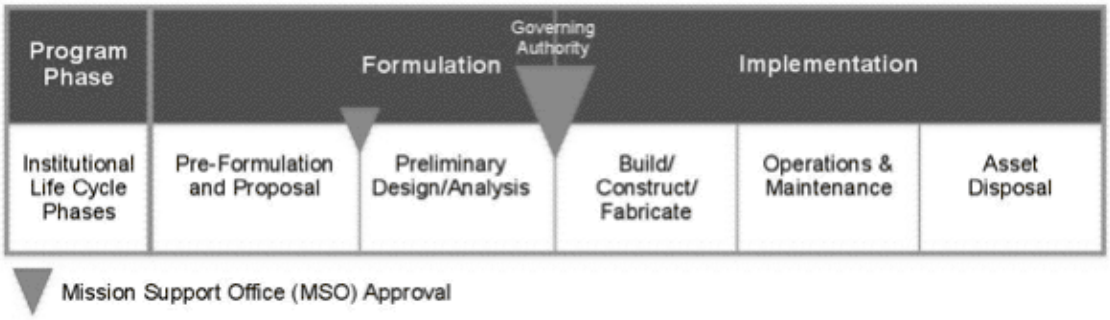


Figure 7-1: Capital Assets Project Life Cycle for Institutional Projects

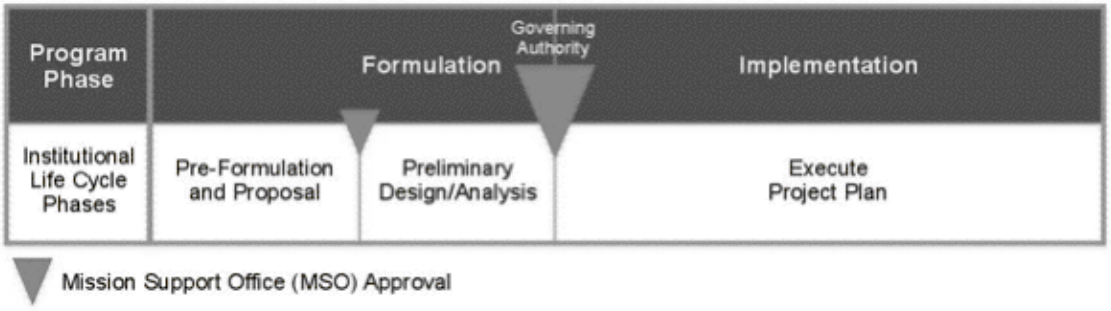


Figure 7-2: Non-Capital Assets Project Life Cycle for Institutional Projects

7.1.f The Director of the Facilities Engineering and Real Property Division is the Agency's functional leader and authority for the breadth of NASA facilities matters, including master planning, facility requirements analysis and planning, life cycle cost analysis, design, construction, facilities budgeting strategy, acquisition/leasing, maintenance, utilization, and disposal. (See NPD 8820.2, *Design and Construction of Facilities.*) CoF investments, including facility improvements, modifications and upgrades, can be funded directly by programs and projects, or from Agency accounts. In all cases, CoF projects are institutionally managed. This means that when, for example, a flight project needs a new or upgraded facility to meet project requirements, the funding is supplied from the project budget, but the facility investment is managed by a facilities organization located at the appropriate Center or component facility. In normal practice, a Facility Project Manager (FPM) is appointed by the facilities organization to organize, manage, and direct the multitude of activities and complete the assigned facility project work on schedule with the approved funds. FPMs must comply with the requirements of NPD 8820.2, Design and Construction of Facilities, and NPR 8820.2, *Facility Project Implementation Guide.*

7.1.g The Director of the Environmental Management Division is the Agency's functional leader and authority for the breadth of NASA environmental matters, including pollution prevention, compliance, restoration, and conservation. (See NPR 8590.1, *Environmental Compliance and Restoration Program Implementation.*) Environmental Compliance and Restoration (ECR) investments are generally funded from Agency accounts. In all cases, ECR projects are institutionally managed. In normal practice, an Environmental Project Manager (EPM) is appointed by the environmental management organization to organize, manage, and direct the multitude of activities and complete the assigned environmental project work on schedule with the approved funds, as agreed to in a Center Spend Plan negotiated by the Center Environmental Manager and the Director of the Environmental Management Division. EPMs must comply with the requirements of NPR 8590.1, *Environmental Compliance and Restoration Program Implementation.*

7.1.h The requirements of Chapter 2 and 3 for NASA programs do not apply to CoF or ECR investments because real property program planning is contained within an existing overarching facility master plan consisting of a

network of Center Real Property Master Plans (CMPs). Individual real property projects are addressed within the context of the CMPs. The ECR program consists of projects that are planned and negotiated between Centers, Headquarters, and regulatory agencies.

7.1.i The Chief Information Officer (CIO) establishes best practices for the development of IT solutions[44] and maintains oversight responsibility for all IT investments in the Agency, which come in three types:

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[44] The CIO must integrate mission-unique IT systems, into other multi-user mission support investments, utilizing common infrastructure tools and services where practical. The result is the NASA Enterprise Architecture (EA) that is based on a broader Federal Enterprise Architecture. The EA also supports NASA's participation in the expanded electronic government initiative (e-Gov). NASA's EA is supported by the companion Information Resources Management (IRM) Strategic Plan, which provides long-range guidance to IT investments.

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a. **Office Automation and Infrastructure Technology (OAIT) -** indirectly funded services provided across the NASA community that fall into the following three classes: communications services (e.g., wide and local area networks, voice, and video); computing services (e.g., desktop computers, applications software, and data centers), and the electronic work environment (e.g., e-mail, messaging, collaborative systems, and the World Wide Web).

b. **Multi-program/project -** services funded directly from mission accounts used to support multiple projects within a given Mission Directorate. These are generally funded at the mission program-level and managed as a separate institutional project within the program.

c. **Program/project-unique -** services funded directly from mission accounts used to provide IT command, control, and data management services for a particular mission. These are generally funded at the mission project-level and are managed as a project work element.

Multi-program/project and program/project-unique IT investments are the responsibility of mission Program and Project Managers; as such, they report to a GPMC and are an exception to other institutional projects. However, the CIO maintains oversight and approval authority by virtue of his/her presence on the GPMC. OAIT investments are managed by the CIO. The CIO appoints Program Managers who, in turn, appoint Project Managers for OAIT projects.

7.1.j Because of the varied mix of institutional investments and the associated complexity of management responsibility, Table 7-1 is provided to guide institutional program and project managers. Institutional projects implement the same four-part management process as any NASA project with minor changes as outlined in the following sections.

| Type | Subtype | HQ Oversight Responsibility | Approval | Chapter 2 Compliance | Chapter 3 Compliance | ICE |
|---|---|---|---|---|---|---|
| Real Property | CoF | Director, Facilities Engineering and Real Property Division | as per NPD 7330.1 | Not required; defer to NPR 8820.2 | Not required; defer to NPR 8820.2 | as per NPR 8820.2 |
| | ECR | Director, Environmental Management Division | as per NPD 8590.1 | Not required; defer to NPR 8590.1 | Not required; defer to NPR 8590.1 | as per NPR 8590.1 |
| IT | OAIT | Chief Information Officer (CIO) | Governing Authority | Required, as modified below | Required, as modified below | Categories I and II only |
| | Multi-Program/ Project | | Program-level GPMC with CIO participation | | | |
| | Program/ Project-Unique | | Project-level GPMC with CIO participation | | | |
| OFI | Education | Chief Education Officer (CEO) | Governing Authority | Required, as modified below | Required, as modified below | Categories I and II only |
| | Other | Cognizant MSOD | | | | |

Table 7-1 Institutional Projects Management Requirements Summary

## 7.2 Project Formulation

7.2.1 Institutional projects are similar to other projects in terms of the level of analysis and management practices needed for successful execution. As with other projects, the cognizant Mission Support Office will usually invest in a period of concept screening (e.g., business case analyses) prior to committing to an institutional project. This up-front effort is considered part of the project pre-formulation period, as referenced in paragraph 3.2.a. All IT projects require the submission of a business case in accordance with OMB Circular A-11.

7.2.2 Requirements: This document recognizes that different development models and historical practices apply. IT and OFI projects often take the form of spiral or incremental developments with a sustained level-of-effort throughout development. CoF and ECR projects, on the other hand, are usually waterfall developments following tried-and-tested construction practices. Therefore, separate requirements are identified below.

7.2.2.1 For CoF projects, the FPM shall comply with the requirements of NPR 8820.2, *Facility Project Implementation Guide,* rather than Section 3.2 of this document. For ECR projects, the EPM shall comply with the requirements of NPR 8590.1, *Environmental Compliance and Restoration Program Implementation,* rather than Section 3.2 of this document.

7.2.2.2 For IT and OFI projects, the Project Manager and the project team shall:

7.2.2.2.a Comply with the requirements of Section 3.2.

7.2.2.2.b Prepare a Project Plan containing the elements described in Appendix D with the following modifications:

1. In Part 2, Resources, the Project Manager shall employ the appropriate WBS template for the overall structure of the project.
2. Project IT investments shall be separately planned for, evaluated in terms of Return on Investment (ROI), budgeted, and managed.

i. Planning shall cover the life cycle of the project and be sufficient to provide for data recovery, contingency facilities, and reconstitution of critical IT resources.

ii. The IT Project Manager shall conduct risk assessments in accordance with NIST Special Publication 800-30, *Risk Management Guide for Information Technology Systems,* and prepare an IT Security Plan in accordance with NIST Special Publication 800-18, Guide for Developing Security Plans for Information Technology Systems.

7.2.2.2.c The Project Manager shall comply with the requirements of NPR 7150.2, NASA Software Engineering Requirements, for software elements.

7.2.2.3 Because of the nature of institutional projects, the duration of the project may be substantially shorter than the life of the asset created. The Project Plan shall address the transition of responsibility for the asset to the receiving operations and sustainment organization.

## 7.3 Project Approval

7.3.1 For CoF projects, approval authority is outlined in NPD 7330.1, *Approval Authorities for Facility Projects.* The CoF approval process and project management requirements are found in NPD 8820.2, *Design and Construction of Facilities,* and NPR 8820.2, *Facility Project Implementation Guide.* These documents provide the framework and accepted best practices for planning and execution of facility projects.

7.3.2 NPR 8590.1, *Environmental Compliance and Restoration Program Implementation,* outlines the approval authority, approval process, and project management requirements for planning and execution of ECR projects.

7.3.3 For all other institutional projects, the Project Manager shall meet the requirements of paragraph 3.3.3. Institutional projects, like other projects, are subject to a NAR prior to implementation and an ICE, if warranted by project category. As a part of securing approval, all projects with IT elements shall be assessed against compliance with the current approved version of the NASA Enterprise Architecture (EA). This means that the CIO must have access to mission Program and Project Plans when they contain IT elements. Approval of such plans is provided by the OCIO through participation in the IC and GPMC structures.

## 7.4 Project Implementation

7.4.1 Because institutional projects may create assets which are transitioned to the user or application community, institutional project implementation requires especially close interaction between the project team and that community.

7.4.2 During CoF project implementation, the FPM shall comply with the requirements of NPR 8820.2, *Facility Project Implementation Guide,* rather than Section 3.4 of this document. During ECR project implementation, the EPM shall comply with the requirements of NPR 8590.1, *Environmental Compliance and Restoration Program Implementation,* rather than Section 3.4 of this document.

7.4.3 During IT and OFI project implementation, the Project Manager shall:

7.4.3.a Comply with the requirements of Section 3.4.

7.4.3.b Monitor changes to security plans and procedures to ensure that the project's security controls and implementation activities are well-matched to threat assessments related to physical and information security.

7.4.3.c Prepare user operational training and familiarization documentation to ensure a smooth transition-to-use, customer acceptance, and high utilization of the product or service under development.

7.4.3.d For IT investments, utilize NASA software assurance personnel and the requirements found in NASA-STD-8739.8, *Software Assurance Standard,* and when indicated or selected, use the NASA IV&V capabilities.

7.4.3.e Provide the MSOD a Project Status Report (PSR) in formats ready for reporting to the OCFO when required to do so, as defined in GAO Report B-237602, "Project Status Reports."[45] The OCFO will validate the PSR and forward it, through the Office of Legislative Affairs, to the appropriate congressional committees.

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[45] A PSR is prepared for a project when it reaches the $200 million cost threshold for its total estimated research and development

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## 7.5 Project Evaluation

7.5.1 Agency visibility into the progress of institutional projects will occur through independent project reviews, program reviews by the governing authority, and biennial (every two years) PIRs conducted by the IPAO. CoF projects are evaluated using the criteria outlined in NPR 8820.2, *Facility Project Implementation Guide,* and ECR projects in accordance with NPR 8590.1, *Environmental Compliance and Restoration Program Implementation.* To support evaluation, all other institutional Project Managers shall comply with the requirements of Section 3.5.3.

7.5.2 IT projects shall be assessed throughout their lifecycle to evaluate their effectiveness in supporting program/project objectives. Assessments shall be made against appropriate metrics and benchmarks to evaluate the cost and performance of IT investments.

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